BHP Navajo Coal Company

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November 5, 2007

Mr. John Tinger
United States Environmental Protection Agency
Region IX (WTR-5)
75 Hawthorne Street
San Francisco, California 94105

Re: National Pollutant Discharge Elimination System (NPDES) Permit NN0028193 – BHP Navajo Coal Company – Navajo Mine

Dear Mr. Tinger:

BHP Navajo Coal Company ("BNCC") appreciates this opportunity to submit this response to the March 2, 2007 letter of comments submitted by the San Juan Citizens Alliance, Dinè Citizens Against Ruining our Environment, and the Clean Air Task Force (collectively the "Citizens Alliance"). This letter begins with an introduction and summary of BNCC's responses to the Citizens Alliance's comments (Part I). The letter then provides more detailed responses to individual comments (Part II).

There are three attachments to this letter. Attachment 1 is a technical report, prepared by Norwest Applied Hydrology -- "Technical Review of a Report Prepared by D.A. Zimmerman (2005) Entitled: ***A Preliminary Evaluation of Potential For Surface Water Quality Impacts From Fly Ash Disposal at the Navajo Mine, New Mexico*** (the "Norwest Report"). The Norwest Report was prepared at the request of BNCC to review and respond to the May 23, 2005 report prepared by D.A. Zimmerman and used in the Citizens Alliance letter of comments. ("Zimmerman Report"). Attachment 2 is the Supplemental Groundwater Monitoring Study ("SGS") of BNCC, which is on file with OSM as Appendix 11-MM of BNCC's Permit Application Package. Attachment 3 is the Probable Hydrologic Consequences ("PHC") study of BNCC that accompanied BNCC's Permit Application Package to OSM. Chapter 11.6. This letter and all its attachments are for inclusion in the administrative record.

I. INTRODUCTION AND SUMMARY OF RESPONSES

BNCC's NPDES Permit No. NN0028193 ("NPDES Permit") should be renewed as proposed by EPA in its Notice of Proposed Action. EPA first issued an NPDES permit for Navajo Mine in 1977. The terms of the proposed renewal of the NPDES Permit are quite similar to the terms of the NPDES permit that it renews and the terms of the NPDES permits that came before it.[1] The NPDES permit concerns rarely used outfalls for surface drainage at Navajo Mine.

The Citizens Alliance letter of comment focuses on coal combustion wastes ("CCBs). CCBs have been placed subsurface in mine pit backfills at Navajo Mine since 1971 and regulated under regulatory regimes other than the Clean Water Act. The Clean Water Act's NPDES permitting requirements never applied to the CCBs because surface drainage does not mingle with the CCBs buried subsurface at Navajo Mine. The buried CCBs are outside of any jurisdictional water, and do not result in discharge of a pollutant from the CCBs to any jurisdictional water. No significant change in these circumstances has occurred since the last issuance of the NPDES Permit, and the Citizens Alliance's effort now to alter and greatly expand the scope of the proposed NPDES Permit renewal terms in order to address its recent concerns about CCBs buried subsurface at Navajo Mine is without basis and should be rejected.

The Citizens Alliance's request that the NPDES Permit be expanded to regulate various aspects of subsurface disposal of CCBs seems to be based largely, on the Zimmerman Report, which was prepared in 2005. The Zimmerman Report was funded by environmental groups to respond to information presented by BNCC and the Office of Surface Mining ("OSM") at a National Academy of Sciences meeting in December 2004 concerning coal combustion residue.[2] The Zimmerman Report was conducted with an incomplete data set, and it provides inadequate basis for the conclusions it reaches and for the effluent limits and permit conditions the Citizens Alliance seek. Summarized below are several primary points in response to the letter of comments and Zimmerman Report. More detail is presented in Part 2 of this letter.

Contrary to inferences drawn by the Zimmerman Report, existence of higher constituent concentrations downstream from the mine than upstream should not be attributed to disposal of CCBs at the mine. The Citizens Alliance uses that report to infer that because data from Chaco River show higher concentrations of certain constituents downstream of the mine than upstream, the difference

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[1] The proposed permit renewal incorporates recent regulatory changes that are not central to the Citizens Alliance position, but otherwise it does not change the previous permit significantly.

[2] Although the Zimmerman Report states in its introduction that it "was undertaken to support" a National Research Council ("NRC") study, and its cover prominently references the National Academy of Sciences ("NAS"), the report was not commissioned or adopted by either NRC or NAS. In fact the comprehensive 2006 report of the National Research Council, Managing Coal Combustion Residues in Mines, observed that environmental impacts described by the Zimmerman Report and others "have not withstood the scrutiny of review by the scientific and/or regulatory communities" and therefore "are not explicitly discussed in this report." p. 82

should be attributed to an unidentified and unproven discharge from Navajo Mine. The attached Norwest Report demonstrates that EPA should reject that blanket assumption because the upstream and downstream data used by Citizens Alliance is incomplete and does not support their assumption. Moreover, the Norwest Report concludes that the difference in concentrations is due to natural factors.

There is no discharge from CCBs at Navajo Mine to any jurisdictional water. First, BNCC does not place CCBs in jurisdictional waters; they are placed in dry subsurface pits outside of jurisdictional waters. Second, because CCBs are buried in subsurface pits, no surface runoff from CCBs has or could reach jurisdictional waters. Third, even if pollutants in ground water with a connection to jurisdictional waters were in some circumstances regulated by the Clean Water Act, the Navajo Mine does not present such circumstances. The Citizens Alliance fails to demonstrate contamination of ground water acquifers resulting from placement of CCBs in mine pits at Navajo Mine or any hydrologic connection between CCB placement locations and any surface waters, including Bitsui Wash, Chinde Wash, or the Chaco River. To the contrary, data in the Norwest Report indicates the absence of any contamination or such hydrologic connection.

II. RESPONSES TO CITIZENS ALLIANCE COMMENTS

A. BNCC's Subsurface Placement of CCBs Has Not Caused An Increase in TDS, Sulfate, Boron or Selenium in the Chaco River or Bitsui Wash

Both the Zimmerman Report and the Citizens Alliance letter attempt to link increased levels of sulfates in water collected at downstream monitoring stations to disposal of CCBs at the Navajo Mine. The Norwest Report establishes that those efforts ignore several physical realities.

1. Leachates from CCBs have low concentrations of soluble sulfates relative to sulfates in alluvial ground water and ground water in mine backfill, and therefore an increase in sulfate concentrations is not an indicator of contamination by CCBs.

2. Sulfate levels in the region commonly increase as water moves through watersheds of arid and semi-arid lands due to the dissolution of naturally occurring sulfate-bearing minerals, such as gypsum. Thus, surface water in the Chaco Basin will typically demonstrate increased levels of sulfate in the lower reaches of the watershed. Evaporation also contributes to increased sulfate concentrations in the lower reaches.

3. CCBs are buried in subsurface pits, surrounded by overburden and not exposed to surface runoff.

Below, these circumstances are discussed in greater detail.

1. Chaco River: The Citizens Alliance's claim that "historic reporting" indicates that concentrations of TDS, sulfate, boron and selenium are increasing to a statistically significant degree in the Chaco River from points upstream of the Navajo Mine to points downstream of the mine is not supportable. The Citizens Alliance relies upon a discussion in the Zimmerman Report to suggest that such downstream increases in concentrations are the result of CCBs disposal at the mine. That link between constituent concentrations and disposal of CCBs at the mine is erroneous for several reasons.

First, the Zimmerman Report seems to confuse the burying of CCBs for mine backfill at the Navajo Mine with the use of surface impoundments by Arizona Public Service for the CCBs from Four Corners Power Plant Units 1 – 3 (e.g., "...fly ash is piled unprotected and left in mountains...," p. 21). The Power Plant is not the subject of this NPDES permit. It and its operators are distinct from Navajo Mine and BNCC. BNCC does not place CCBs in surface impoundments. Instead, as described in the Norwest Report, BNCC places CCBs in subsurface pits on the mine site. Those pits are located in subsurface strata that dip to the east, away from the Chaco River, at levels well below the alluvium. Norwest Report, p. 35. The CCBs are encased in low permeability overburden and are capped with at least ten (10) feet of low permeability cover material before being covered with topsoil. Moreover, major drainages in the reclaimed areas are not routed over the CCB backfill areas. Thus, the CCB are not exposed to surface water runoff at the Navajo Mine, and it is therefore unnecessary and improper to include in the renewal of Permit No. NN0028193 the monitoring and effluent limitation requirements that the Citizens Alliance requests. Norwest Report, pp. 5, 8-9.

Second, water quality data does not indicate that disposal of CCBs at Navajo Mine is causing concentrations of water quality constituents in washes near Navajo Mine to increase. In preparing its report, Norwest Applied Hydrology ("Norwest") has undertaken a thorough review of the publicly available data available through the OSM Library in Denver, Colorado concerning the hydrology and geology at Navajo Mine.[3] Norwest Report, pp. 7-9. Norwest concludes that there is no cause and effect relationship between disposal of CCBs at Navajo Mine and water quality in the Chaco River based in part on its more comprehensive review of the publicly available data on Navajo Mine in the OSM library and on data contained in the Zimmerman Report. The Norwest Report states:

> No information or data presented in the Zimmerman Report indicates a cause and effect relationship between CCBs disposal operations at the Four Corners Generating Station or the placement of CCBs in mine backfill at the Navajo Mine and the water quality in the Chaco River. In fact, hydrologic information and observations at the Navajo Mine indicate that CCBs in mine backfill at the Navajo Mine has not impacted

[3] Although this public information is available through OSM, the Zimmerman Report neglects to use it. That Report's elaborate explanation (pp. 6-10) about why its data is "insufficient" is not only questionable argument for a scientific report, but it also ignores information at OSM that the report fails to use.

> water quality in the Chaco River. CCBs at the Navajo Mine are placed in mine pits that are excavated in subsurface strata that dip to the east, away from the Chaco River. These mine pits are well below the elevations of the alluvium of any tributaries to the Chaco River that cross the Navajo Mine lease. At the northern portion of the mine, any ground water associated with CCB placement in the Watson, Bitsui, Dodge, Custer and Bighan Pits cannot flow to the west toward the Chaco River because of the ten to twenty-five foot thick shale layer separating the bottom of the pit from the Pictured Cliffs Sandstone (PCS) and the higher ground water levels in the PCS due to the influence of Morgan Lake which preclude such a pathway.

Norwest Report, p. 34.

Norwest concludes that the "statistical analysis of water quality monitoring data provided in the Zimmerman Report does not demonstrate a cause and effect relationship between water quality constituents in the Chaco River and the presence of either the Navajo Mine to the east along the lower segment of the Chaco River or the past disposal of CCBs in surface impoundments at the FCGS." Norwest Report at p. 34. As the Norwest Report explains,

> Furthermore, the statistical analysis of water quality monitoring data provided in the Zimmerman Report does not demonstrate a cause and effect relationship between water quality constituents in the Chaco River and the presence of either the Navajo Mine to the east along the lower segment of the Chaco River or the past disposal of CCBs in surface impoundments at the FCGS. The Zimmerman report includes a statistical analysis of TDS, sulfate, boron, and selenium concentrations of surface water quality monitoring stations located along the Chaco River and a number of its tributaries. The statistical analysis consists of separating the data from the stations into the two groups outlined in Figure 12 of the Zimmerman Report. A copy of that figure has been provided in the report as Figure 13.
>
> As shown on Figure 13 of the report, the downstream stations are primarily locations along the perennial flow segment of the Chaco River and include one station on Chinde Wash that is influenced by NAPI irrigation return flows. The upstream stations consist of locations along the ephemeral flow segment of the Chaco River and locations within tributary segments, many of which are in the headwaters. Given this grouping of stations, it is to be expected that soluble water quality constituents, such as TDS, sulfate, selenium and boron, would be higher at stations near the mouth of the drainage basin. Similar trends occur throughout most drainage basins in the semi-arid portions of the

> western United States. The reason for the increase is that soluble constituents increase in the downstream direction due to the dissolution of soluble salts and the concentrating effects of evapotranspiration.
>
> Furthermore, baseflow from regional ground water generally increases in the lower portions of a drainage basin. Regional ground water flow in the lower portions of drainage basins typically has much higher concentrations of salts than local ground water flow systems in the upper portion of drainage basins. Thus, the cause of the increase in soluble water quality constituents at the downstream segment is unrelated to CCB placement in pits at Navajo Mine or Four Corners Generating Station. This natural downstream increase in the concentration of salts occurs in the Chaco River. In fact, the grouping of stations for statistical analysis in the Zimmerman Report specifically separates the intermittent and perennial flow stations within the downstream segment of the Chaco River basin from the other stations. As a result, the data from the downstream stations reflect the higher soluble salts in regional ground water discharge, which only occurs within the downstream segment referred to in the Zimmerman Report.

Norwest Report at pp 33-34.

2. Bitsui Wash: The Citizens Alliance also contends that levels of sulfate, TDS, and boron monitored in the surface waters of Bitsui Wash by the Navajo Nation EPA downstream of the CCBs placed in Bitsui Pit have risen, "indicating the CCBs are the source of the degradation in the Wash." Citizens Alliance Letter at p. 2. In fact, however, the Norwest Report establishes that "average TDS, sulfate and boron concentrations decreased at the surface water monitoring station NB-2 on Bitsui Wash down gradient of the mine in comparison with the concentrations observed at the surface water monitoring station NB-1 on Bitsui Wash up gradient of the mine." Norwest Report at p. 33. As the Norwest Report explains:

> The Zimmerman Report concedes that "the data from only 5 of the 7 monitoring stations listed in Table 7-7 of the PAP were reviewed." The other two stations, NB-1 and NB-2, are located on Bitsui Wash. As shown in Table 4, the data from these stations show that the mine does not result in increased TDS concentrations at the station downstream of the mine. Under natural conditions, Bitsui Wash would flow ephemerally during times of high precipitation. However, due to the existence of NAPI and its associated irrigation return flows, this stream flows intermittently at both monitoring stations. NB-1 is located upstream of the mining at the Bitsui Pit before SMCRA regulation was implemented and there is no mining disturbance located upstream of this station. NB-2 is located downstream of Bitsui Pit and receives precipitation runoff

> from areas of historic mining that predates SMCRA. The water quality summaries for these two stations in Table 4 shows that the average concentrations of TDS, sulfate and boron actually decrease at the station NB-2, located downstream of mining, in comparison with the station NB-1 located upstream of mining.

Norwest Report at 32. Moreover, the NPDES Permit outfalls are not at Bitsui Wash; Bitsui Wash is unrelated to the NPDES Permit.

3. CCB Disposal Operations Do Not Require an NPDES Permit. The Norwest Report establishes not only that there is no correlation between disposal of CCBs and constituents in nearby washes, but it also supports that disposal of CCBs at Navajo Mine falls outside the proper scope of an NPDES permit. Generally speaking, an NPDES permit is not necessary for an activity that does not involve the discharge of a pollutant from a point source into navigable waters. Clean Water Act, §§ 301(a) and 402. The only discharges that have occurred at Navajo Mine have been permitted under the existing Section 402 permit. They have been infrequent and have met NPDES effluent limits. These discharges have occurred in locations unrelated to CCB disposal.

The Norwest Report establishes that CCB disposal operations do not result in a discharge of a pollutant from a point source into navigable waters.

1. The CCBs are deposited outside of jurisdictional waters.

2. There is no surface runoff across the CCBs; they are buried in pits.

3. Not only is there no surface connection between CCBs and the adjacent washes, there is no ground water connection resulting in a discharge of a pollutant. The Norwest Report validates the conclusion that CCBs have not caused ground water contamination.

4. Furthermore, Norwest validates that constituents found in ash, have not entered nearby jurisdictional water through ground water.

B. Additional Monitoring for Arsenic, Cadmium, and Lead Is Neither Necessary nor Appropriate.

The Citizens Alliance premises its request that EPA include "water-quality based effluent limits for arsenic, cadmium and lead in NPDES permit NN0028193" on the assumption that these constituents are "rising to harmful levels in the Shumway Arroyo alluvium" as a result of placement of CCBs in pits. The Norwest Report and the extensive documentation on file with the OSM concerning the Navajo Mine lease area demonstrate that the Citizens Alliance's premise is invalid in several respects:

1. The Shumway Arroyo is not at Navajo Mine; it is near San Juan Mine, which is located approximately 13 miles to the north, on the north side of the San Juan River. The allegations about a connection between CCBs and the Shumway Arroyo are not relevant to Navajo Mine.

2. As described above, the CCBs at Navajo Mine are placed in locations and at depths that prevent any groundwater that may come into contact with the CCBs from reaching surface water. ***See, e.g.*** Norwest Report at p. 30 ("These mine pits are well below the elevations of the alluvium of any tributaries to the Chaco River that cross the Navajo Mine lease. At the northern portion of the mine, any ground water associated with CCBs placement in the Watson, Bitsui, Dodge, Custer and Bighan Pits cannot flow to the west toward the Chaco River because of the ten to twenty-five foot thick shale layer separating the bottom of the pit from the Pictured Cliffs Sandstone. . . . Norwest Report, p. 35 ")

3. The mine spoils around the CCBs placed at the Navajo Mine retard migration in groundwater of the contaminants of concern as demonstrated in the Norwest Report, the Supplemental Groundwater Study, leach studies on file with OSM, and other records. ***See, e.g.***, Norwest Report; p. 26.

4. The extensive monitoring data on file with OSM establishes that the CCBs placed at the mine are not impacting groundwater. As the Norwest Report summarized:

> The Zimmerman Report concludes its review of the SGS with the statement that the SGS does not conclusively demonstrate that CCB disposal activities have a negligible impact on off-lease surface and ground water quality. The report also questions how the results of the SGS, a local scale study at Bitsui Pit, can be used to support the statement that CCB disposal has negligible impact on regional ground water quality. The question fails to recognize that the study focused on the Bitsui Pit because of the pit and CCB saturated from nearby NAPI irrigation and the potential for off-site migration of ground water from the mine backfill. CCB were placed in the Bitsui Pit prior to SMCRA and prior to NAPI irrigation. The Bitsui Pit is the only location at the mine where CCBs are placed in a backfilled mine pit where significant levels of saturation subsequently developed. Furthermore, concurrent with the SGS at the Bitsui Pit, monitoring wells were also completed in the CCB disposal locations within the Watson, Custer and Doby pits. All but the Watson-4 well were dry. Saturation in the Watson-4 well was limited to about 1 to 2 feet above the base of the mine pit. The limited saturation in Watson-4 well and the dry condition in the downgradient Watson-1 well demonstrate that CCB disposal at these pits has negligible contact with or impact on regional ground water.

Norwest Report at p. 24.

In light of the Norwest Report conclusions, the Citizens Alliance's request for additional monitoring is contrary to the Clean Water Act. In the absence of any credible connection between disposal of CCBs in buried pits and a discharge of a pollutant to a navigable water, the requested permit conditions for enhanced monitoring should be rejected as beyond the appropriate scope of an NPDES permit. The Citizens Alliance would have EPA essentially assume jurisdiction over regulation of CCBs disposal operations well outside of jurisdictional waters, despite the absence of credible evidence tying disposal of CCBs to the proper subject of an NPDES permit – the discharge of pollutant from a point source into jurisdictional waters. OSM has been regulating mine disposal of CCBs in pits. It also has issued an advanced notice of proposed rulemaking to propose new regulations pertaining to placement of coal combustion byproducts at surface mines. 72 Fed. Reg. 12026-12030 (March 14, 2007).

The Citizens Alliance also relies upon a January 3, 1994 Guidance Memorandum from the West Virginia Office of Mining and Reclamation entitled "Disposal and Utilization of Coal Ash on Surface Mining Operations" as precedent to support its claim that EPA should establish additional effluent characterization, monitoring and limits for this permit. The Guidance Memorandum was issued more than 5 years before the EPA studies and final regulatory determination concerning CCBs. EPA should not premise its permitting decisions on a state document from West Virginia, inapplicable to New Mexico.

D. The Citizen Alliance's Request for Further Characterization of CCBs Are Unnecessary and Should be Denied.

The Citizens Alliance request that EPA require additional characterization of the CCBs being placed at Navajo Mine is unnecessary for several reasons. First, extensive work has already been undertaken to characterize the CCBs. Both the Supplemental Groundwater Study and the Probable Hydrologic Consequences study, both of which accompany BNCC's application to OSM, already provide detailed analysis of the constituents and leach characteristics of the CCBs. Copies of both of those documents are attached to this letter as Attachments 2 and 3, respectively. The Supplemental Groundwater Study was thoroughly reviewed by both OSM and the Navajo Nation EPA as part of BNCC's significant mine permit revision to permit CCBs placement. That mine permit revision was approved after a determination was made that CCBs placement is an environmentally sound practice that would comply with all applicable environmental standards and requirements.

Second, as described above, long term monitoring of pits containing CCBs at the Navajo Mine demonstrates that only one pit, Bitsui Pit, contains CCBs with significant moisture content. The monitoring further demonstrates that CCBs placement does not have an impact on groundwater or surface water in the area.

Once again, BNCC appreciates the opportunity to provide this response to the comments concerning the renewal of NPDES permit NN0028193. Please feel free to raise any questions you may have.

Very truly,

Kent Applegate

cc: Charles Roybal

ATTACHMENT 1

Norwest Report

TECHNICAL REVIEW OF A REPORT PREPARED BY D. A. ZIMMERMAN (2005) ENTITLED: "*A PRELIMINARY EVALUATION OF POTENTIAL FOR SURFACE WATER QUALITY IMPACTS FROM FLY ASH DISPOSAL AT THE NAVAJO MINE, NEW MEXICO.*"

Submitted to:
BHP NAVAJO COAL COMPANY

October 22, 2007

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TABLE OF CONTENTS

List of Tables

List of Figures

Table of Abbreviations

BNCC – BHP Navajo Coal Company

CCB – Coal Combustion Byproducts

DFD – Doby French Drain

EIA - Environmental Impact Assessment

EIS – Environmental Impact Statement

FCGS – Four Corners Generating Station

NAH – Norwest Applied Hydrology

NAPI – Navajo Agricultural Products Industry

OSM – Office of Surface Mining

PAP – Permit Application Package

PCS – Pictured Cliffs Sandstone

PHC – Probable Hydrologic Consequences

SGS – Supplemental Groundwater Study

SMCRA – Surface Mining Control and Reclamation Action

SWL – Static Water Level

TDS – Total Dissolved Solids

1 INTRODUCTION

Norwest Applied Hydrology ("NAH") prepared this report at the request of BHP Navajo Coal Company ("BNCC") to provide a technical review and response to the report by D.A Zimmerman entitled "A Preliminary Evaluation of Potential for Surface Water Quality Impacts from Fly Ash Disposal at the Navajo Mine, New Mexico 2005" (the "Zimmerman Report"). The Zimmerman Report's stated objective was an evaluation of the adequacy of the data and legitimacy of the conclusions in BNCC's December 7, 2004 presentation to the National Academy of Sciences (NAS) Committee on Mine Placement of Coal Combustion Waste entitled "Placement of Coal Combustion Byproducts (CCB) at New Mexico Coal Operations."

BNCC's Presentation to NAS concluded that placement of CCBs in mined out areas is an environmentally sound practice in Northwestern New Mexico based on the following reasons:

- CCBs are placed in locations within the pit that are generally dry or free of ground water in accordance with the approved SMCRA permit.
- The spoil or backfilling material is generally silty or clayey and provides a natural barrier to water movement into or out of the CCB materials placed within the backfill.
- CCB materials are chemically similar to backfill material encountered at the mine.
- CCB placement plans and engineering controls, including covering with sufficient material to prevent plant roots and surface water from directly coming into contact with CCBs. are reviewed, approved and monitored by regulatory authorities.
- Mine site placement of CCB reduces total land disturbance and eliminates offsite transport and disposal.
- No significant impacts to the environment are predicted.
- CCB placement is heavily regulated and monitoring is required until final bond release.

BNCC's Presentation to NAS also included the results of a monitoring study of CCBs placed in a mine pit in the northern portion of the mine referred to as the Bitsui Pit. The Bitsui Pit was mined in the 1960s and CCBs were placed in the Bitsui Pit during backfilling of the pit in the 1970's. The study was performed because saturation conditions developed in this pit as a result of irrigation activity by NAPI, which began at locations adjacent to the Bitsui Pit in the early 1980s. This study showed that even where groundwater is present, the water quality of leachate from the ash is similar to that of water that contacts only backfill and both ash and backfill waters have TDS levels similar to baseline.

The Zimmerman Report takes issue with BNCC's conclusion that no significant impacts to the environment are predicted or expected as a result of CCB placement at the Navajo Mine. Based on what he conceded was a limited data review, Zimmerman advances interpretations and reaches conclusions that he asserts warrant further investigation. In this report, NAH has investigated in greater depth using relevant publicly available information from the Navajo Mine and Office of Surface Mining (OSM) files the conclusions in the BHP presentation and the alternate interpretations and conclusions provided in the Zimmerman Report.

2 EXECUTIVE SUMMARY

The Zimmerman Report's assertions that BHP's monitoring data in the vicinity of Bitsui Pit indicate "ash-constituent migration toward the mine-permit boundary" and that CCB disposal practices have already adversely impacted the water quality in the Chaco River are not supported by the voluminous, publicly available data. This report provides the data and interpretations that refute these assertions.

The Zimmerman Report accuses BNCC of making misleading and/or unsupported statements to the NAS Committee and specifically references the statement that "groundwater is very saline with total dissolved solids typically > 10.000 mg/l toward the basin interior and > 25,000 mg/l to the east" as an example. However, it is clear from the baseline ground water data presented in the PAP that the ground water in the coals of the Fruitland Formation within and near the Navajo coal lease is very saline. The median TDS concentration for all coal wells within the lease is over 8,000 mg/l and TDS concentrations increase to levels greater than 40,000 mg/l within distances of a mile or less in the coal downgradient of the lease boundary. Thus, the statement by BNCC is neither misleading nor unsupported. On the contrary, the Zimmerman Report suggestion that a TDS value of 2,345 mg/l is representative of baseline conditions for the Fruitland Formation near the mine is misleading and unsupported.

The Zimmerman Report improperly relies upon surface water quality data from the San Juan River that is impounded in Morgan Lake and from Gallegos Canyon 18 miles to the east to draw conclusions about ground water quality impacts associated with subsurface disposal of CCBs at Navajo Mine. First, neither of those surface water sources are representative of the ground water in the vicinity of the Navajo Mine. Second, the Zimmerman Reports' attempt to link increasing surface water sulfate levels to placement of CCBs in backfill at Navajo mine is unsupported by the data. Both the leaching tests and the ground water monitoring results obtained by BNCC demonstrate that sulfates are at lower concentrations in CCBs than in the native overburden rock that has been used to backfill the mine pits. It is quite unlikely that CCB placement at the mine causes increased sulfate levels.

Third, ground water studies and ground water monitoring in the only CCB placement areas that have been exposed to ground water infiltration demonstrate that CCB leachates at the Bitsui and Watson Pits do not materially impact ground water quality. BNCC has conducted ground water studies and monitoring at these pits that were mined and backfilled prior to SMCRA and were not included in BNCCs past or current SMCRA permits. The Zimmerman Report questions how a local scale study at Bitsui Pit can be used to support the statement that CCB disposal has negligible impact on regional ground water quality. This question fails to recognize that the study focused on the Bitsui Pit because this is the only location at the Navajo mine where CCBs have been placed in a backfilled mine pit where significant levels of saturation have developed. Some saturation has also developed within the backfill of the Dodge Pit due to NAPI irrigation return flow seepage along the highwall at the northeast side of the pit, but CCBs were not placed within the saturated portion of this pit. Monitoring wells were also completed in CCB disposal

locations within the Watson, Custer and Doby pits. All but the Watson-4 well were dry and the saturation in the Watson-4 well was limited to about 1 to 2 feet above the base of the mine pit. These data demonstrate the dry condition of CCB placement at all locations but the Bitsui and Watson Pits. Furthermore, the limited saturation in the Watson–4 well and the dry condition in the downgradient Watson-1 well demonstrate that CCB disposal at the Watson Pit has negligible contact with or impact on ground water.

The Supplemental Groundwater Study (SGS) included as Appendix 11-MM of the PAP concludes that "ash burial and potential ash affected groundwater does not impact the water quality or quantity significantly as to change the designated use or classification of groundwater or surface water." The SGS found that regional ground water use of the Fruitland Formation is virtually nonexistent due to poor water quality and poor water yield. This statement is supported by studies completed by the US Geological Survey and by Office of Surface Mining. The baseline monitoring data obtained by BNCC also shows that ground water quality in the Fruitland coals and Pictured Cliffs Sandstone within the mine lease is poor, with TDS concentrations typically greater than 5,000 mg/l. Further down dip the baseline ground water TDS concentrations typically exceed concentrations of 30,000 mg/l, which is not suitable for any use due to the very high TDS.

The Zimmerman Report erroneously concludes that mine water leachates are the cause for the increase in TDS and sulfate observed at the Chinde Arroyo monitoring station downstream of the mine in comparison with the monitoring station on Chinde Arroyo upstream of the mine. While an increase in TDS and sulfate has been observed, the increase is the result of the concentrating influences of evapotranspiration loss from the wetlands areas associated with the Chinde Diversion and NAPI irrigation return flows entering the Chinde Diversion. There are no contributions of surface flows or ground water seepage from the mine area to the Chinde Diversion as the Zimmerman Report suggests.

Finally, the conclusion in the Zimmerman Report that an increase in soluble water quality constituents along the lower perennial flow segment of the Chaco River strongly suggests that mining and CCB disposal practices at the mine have already adversely impacted the quality of the Chaco River is both misleading and unsupported. Increasing TDS and sulfate concentrations are a natural occurrence in drainage basins located within the semiarid west, particularly when comparing data high in the watershed to data much further downstream. The increase is typically due to the dissolution of soluble salts and the concentrating effects of evapotranspiration. The statistical comparisons demonstrate no cause and effect relationship between CCB placement at the mine and water quality in the Chaco River.